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Processing Low Quality Trees By The SHOLO Approach[1]

Vern P. Yerkes[2/]

Abstract.--(SHOrt LOg) processing can alleviate some critical problems of processing aspen into a marketable product. High quality bolts (<8') are bucked from each log to the length required by the target product. Only quality blocks are then transported to and handled at the processing mill. This system has proven effective in pallet part production in the eastern U. S. Successful implementation of the SHOLO system requires careful analysis of seven key planning steps. Identification of the target products is essential so all primary processing is directed to these products without need for a secondary processing system.

The Colorado State Forest Products Bulletin of July 1976[3/] contains a statement which graphically portrays some critical problems of processing Aspen into useful consumer products.

> "...merchantable volume is significantly limited by a combination of characteristics which also results in higher processing costs (1) a high proportion of crooked small diameter trees and (2) a high incidence of decay occurring in overmature stands."

The impact of these characteristics can be markedly reduced through high-speed processing of short logs (<8') directly into a marketable product without first processing long logs then remanufacturing lumber into the product.

The suggested approach is to buck low quality crooked stems into short blocks cut to the dimension (length) needed in the target product. All crook possible is bucked out producing short straight blocks. Also any defect not acceptable in the target product can be bucked out. This would mean that only the higher quality sections of the tree would be processed into the product. All other pieces would be relegated to the chipper (or other lower valued product) in the round log form. The operator incurs no unnecessary processing costs by handling those sections of the tree that were unsuited for his product.

This approach to processing low quality and low valued hardwoods has been termed "SHOLO" for SHOrt LOg processing. The concepts have been evaluated by scientists of the Northeastern Forest Experiment Station at the Princeton Forest Products Marketing Laboratory at Princeton, West Virginia. They have also provided a technique of evaluating the economic feasibility of a proposed venture for a given set of circumstances of target product, processing system and raw material source.

You need to have a number of things in mind before such a proposed system should be started:

(1) The product objective must be defined by dimensions and grade if possible. Quality limitations of the round log must be identifiable. Pallet stock, furniture squares, match-block, etc. may be potential products.

1/ Paper presented at the symposium: Utilization and Marketing as Tools for Aspen Management in the Rocky Mountains, Ft. Collins, Colorado, Sept. 8-9, 1976.

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3/ July 1976 Colorado State Forest Service, Forest Products Bulletin V 10 #3.

(2) Sale value of products must be established.

(3) Market values of residues, if present, must be established for both the defective section of stems bucked out and processing residues of the high quality bolts. Pulp chips--cattle feed--bedding flakes, firewood, etc. would be potentials for consideration.

(4) Potential recoveries of usable high quality bolts and residues must be evaluated as a percent of total volumes handled. A specific cruise, etc. may be necessary to determine this.

(5) A processing system must be planned to allow processing of the tree stems at a volume rate and estimated cost to meet the objectives of the firm undertaking the venture. Consider various types of breakdown methods--scragg saw, band saw, gang saw, slab saw, trim saws, etc. that could be used to convert the short blocks into the target product. Consider also various possible combinations of equipment.

(6) An economic analysis must be made to determine if a given system can in fact economically process the available raw material into the target products. If determined not economical, either redesign the processing system into a more efficient configuration or combination of equipment or drop the proposal altogether.

(7) If the above proposal appears economically feasible, then complete design and layout of the processing system and begin construction.

It may take two or three tries at finding an economical processing unit or system or balance of principal breakdown equipment and secondary processing units but it is important to do this to set up the most efficient system possible for the available resource and target products. Remember we are dealing with a low value log to start with so need to be as efficient as possible.

The physical processing of a low quality tree would be as follows:

1. Fell tree and buck, from between defects (if any), all possible high quality blocks that will produce the target product. This may be done at the stump or at a landing or by processor or the tree may be handled full length to the mill for debarking before bucking.

2. Transport product blocks to mill. Transport defective pieces to a chipper, flaker, splitter, etc. for processing.

3. Breakdown blocks into product dimensions. This can be done by a 2 or 4 saw circle scragg, twin or quad band saws or standard circle or band saw with appropriate resaw equipment, whichever results in the lowest production costs for the firm's objectives.

Three methods of log breakdown are discussed by Coleman and Reynolds in their 1973 paper NE-279 Sawing SHOLO Logs: Three Methods.

They found that both yields of products and width recovery are affected by the type of breakdown and amount of effort expended to recover material from slabs.

This system has proven effective in the production of pallet parts from low quality trees in the eastern U.S. The high speed production of single pass systems can more than offset the low quality and potentially high defect volume of these stands.

The key element in the process is the identification of the target product(s) with all processing, from the stump, directed toward those products without going through a secondary processing system.

Annotated Bibliography

1973 Coleman, Ronald E. & Hugh W. Reynolds
Sawing SHOLO Logs: Three Methods.
USDA Forest Service Research Paper
NE 279
Northeastern Forest Experiment Station
6816 Market St., Upper Darby, PA 19082

A discussion of the results of testing 3 breakdown methods for SHOLO logs.

(1) Selective method - logs are sawn through and through on a standard circle or gang sawmill.

(2) Gang method - 4-sided cant produced on a 4-saw circle scragg or quad band then the cant was gang sawed.

(3) Combination method - same initial breakdown as in 2 but with addition of slab resaw and edger saw.

Highest volume recovery was from selective or combination methods. The selective method produced highest proportion of wider boards.

1970 Reynolds, Hugh W. & Charles J. Gatchell
The SHOLO Mill: Make Pallet Parts and Pulp Chips From Low Grade Hardwoods
USDA Forest Service Research Paper 180 NE
Northeastern Forest Experiment Station
6816 Market St., Upper Darby, PA 19082

Presents the details of one example of a processing system to produce pallet shook from SHOLO material from low-grade trees. This is only one example that uses sizeable investments with large volume needed to show a profit. Other systems using lesser investment costs and lower volume demands can produce same results.

1971 Reynolds, Hugh W. & Charles J. Gatchell
The SHOLO Mill: Return on Investment Vs. Mill Design
USDA Forest Research Paper NE 187
Northeastern Forest Experiment Station
6816 Market St., Upper Darby, PA 19082

Presents the analytical techniques used to evaluate the profitability of a proposed set of circumstances including mill design, product objectives, and raw material source. Presents method with nomographs and instructions to complete the analysis.

1972 Yerkes, Vern P.
SHOLO Can Help Make Use of Low-Quality Logs.
Forest Industries V 99 #11 p. 40-41
Oct. 1972

Presents an introduction to the SHOLO mill concepts and planning process for mill design and establishment.